

**Amendment and Response**

Applicant: Charles Chi Jia

Serial No.: 09/945,062

Filed: August 31, 2001

Docket No.: 10004755-1

Title: SYSTEM AND METHOD OF DETECTING SCANNED HALFTONE IMAGE AND ENHANCING SUCH IMAGE FOR REPRODUCTION

**IN THE CLAIMS**

Please cancel claims 1 and 13 without prejudice.

Please add new claims 25-30.

Please amend claims 2, 4, 5, 12, 14, 16, 17, and 24 as follows:

1. (Cancelled)
2. (Currently Amended) The method of ~~claim 1~~ claim 4, further comprising:  
producing an enhanced image with the plurality of enhanced image sections.
3. (Original) The method of claim 2, wherein creating the enhanced image includes at least one of displaying and printing the enhanced image.
4. (Currently Amended) ~~The method of claim 1~~ A method of processing a scanned image produced by scanning a halftone image formed of a plurality of image dots and having a halftone resolution and at least one halftone angle, the method comprising:  
detecting at least one halftone characteristic of the scanned image;  
dividing the scanned image into a plurality of image sections based on the at least one halftone characteristic, each image section including a plurality of pixels and at least one scanned image dot formed within the plurality of pixels; and  
enhancing each of the image sections of the scanned image to create a plurality of enhanced image sections, including diffusing the at least one scanned image dot of each of the image sections,  
wherein detecting the at least one halftone characteristic of the scanned image includes detecting at least one of the halftone resolution and the at least one halftone angle of the halftone image from the scanned image.

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5. (Currently Amended) ~~The method of claim 1~~ A method of processing a scanned image produced by scanning a halftone image formed of a plurality of image dots and having a halftone resolution and at least one halftone angle, the method comprising:

detecting at least one halftone characteristic of the scanned image;

dividing the scanned image into a plurality of image sections based on the at least one halftone characteristic, each image section including a plurality of pixels and at least one scanned image dot formed within the plurality of pixels; and

enhancing each of the image sections of the scanned image to create a plurality of enhanced image sections, including diffusing the at least one scanned image dot of each of the image sections,

wherein the scanned image has a first resolution, and wherein detecting the at least one halftone characteristic of the scanned image includes filtering the scanned image to create a filtered image having a second resolution, wherein the second resolution is less than the first resolution.

6. (Original) The method of claim 5, wherein detecting the at least one halftone characteristic of the scanned image further includes identifying, within the filtered image, a sample area having a predetermined darkness density, locating a first scanned image dot within the sample area, locating, relative to the first scanned image dot, a plurality of additional scanned image dots within the sample area, and determining a relationship between the first scanned image dot and the additional scanned image dots.

7. (Original) The method of claim 6, wherein the predetermined darkness density of the sample area is in a range of approximately 20 percent to approximately 50 percent.

8. (Original) The method of claim 7, wherein the predetermined darkness density of the sample area is approximately 40 percent.

9. (Original) The method of claim 6, wherein determining the relationship between the first scanned image dot and the additional scanned image dots includes determining at least

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one of a distance between the first scanned image dot and the additional scanned image dots and an orientation of the additional scanned image dots to the first scanned image dot.

10. (Original) The method of claim 9, wherein the distance between the first scanned image dot and the additional scanned image dots correlates to the halftone resolution of the halftone image, and wherein the orientation of the additional scanned image dots to the first scanned image dot correlates to the at least one halftone angle of the halftone image.

11. (Original) The method of claim 6, wherein locating the additional scanned image dots includes spiraling outward from the first scanned image dot within the sample area of the filtered image.

12. (Currently Amended) The method of ~~claim 1~~ claim 4, wherein diffusing the at least one scanned image dot includes distributing a darkness density of the at least one scanned image dot to at least one adjacent pixel.

13. (Cancelled)

14. (Currently Amended) The system of claim ~~13~~ 16, further comprising:  
an image reproduction unit adapted to produce an enhanced image based on the plurality of enhanced image sections.

15. (Original) The system of claim 14, wherein the image production unit is adapted to at least one of display and print the enhanced image.

16. (Currently Amended) ~~The system of claim 13~~ A system for processing a scanned image produced from a halftone image formed of a plurality of image dots and having a halftone resolution and at least one halftone angle, the system comprising:  
a halftone characteristic detection unit adapted to detect at least one halftone characteristic of the scanned image;

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an image sectioning unit adapted to divide the scanned image into a plurality of image sections based on the at least one halftone characteristic, each of the image sections including a plurality of pixels and at least one scanned image dot formed within the plurality of pixels;  
and

an image enhancement unit adapted to create a plurality of enhanced image sections, wherein the image enhancement unit is adapted to diffuse the at least one scanned dot of each of the image sections to create a respective one of the enhanced image sections,

wherein the halftone characteristic detection unit is adapted to detect at least one of the halftone resolution and the at least one halftone angle of the halftone image from the scanned image.

17. (Currently Amended) ~~The system of claim 13~~ A system for processing a scanned image produced from a halftone image formed of a plurality of image dots and having a halftone resolution and at least one halftone angle, the system comprising:

a halftone characteristic detection unit adapted to detect at least one halftone characteristic of the scanned image;

an image sectioning unit adapted to divide the scanned image into a plurality of image sections based on the at least one halftone characteristic, each of the image sections including a plurality of pixels and at least one scanned image dot formed within the plurality of pixels;  
and

an image enhancement unit adapted to create a plurality of enhanced image sections, wherein the image enhancement unit is adapted to diffuse the at least one scanned dot of each of the image sections to create a respective one of the enhanced image sections,

wherein the scanned image has a first resolution, and wherein the halftone characteristic detection unit includes a filter adapted to filter the scanned image and create a filtered image having a second resolution, wherein the second resolution is less than the first resolution.

18. (Original) The system of claim 17, wherein the halftone characteristic detection unit is adapted to identify a sample area of the filtered image having a predetermined darkness

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density, locate a first scanned image dot within the sample area, locate, relative to the first scanned image dot, a plurality of additional scanned image dots within the sample area, and determine a relationship between the first scanned image dot and the additional scanned image dots.

19. (Original) The system of claim 18, wherein the predetermined darkness density of the sample area is in a range of approximately 20 percent to approximately 50 percent.

20. (Original) The system of claim 19, wherein the predetermined darkness density of the sample area is approximately 40 percent.

21. (Original) The system of claim 18, wherein the halftone characteristic detection unit is adapted to determine at least one of a distance between the first scanned image dot and the additional scanned image dots and an orientation of the additional scanned image dots to the first scanned image dot.

22. (Original) The system of claim 21, wherein the distance between the first scanned image dot and the additional scanned image dots correlates to the halftone resolution of the halftone image, and wherein the orientation of the additional scanned image dots to the first scanned image dot correlates to the at least one halftone angle of the halftone image.

23. (Original) The system of claim 18, wherein the halftone characteristic detection unit is adapted to spiral outward from the first scanned image dot within the sample area of the filtered image to locate the additional scanned image dots.

24. (Currently Amended) The system of claim ~~13~~16, wherein the image enhancement unit is adapted to distribute a darkness density of the at least one scanned image dot to at least one adjacent pixel.

25. (New) The method of claim 5, further comprising:

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producing an enhanced image with the plurality of enhanced image sections.

26. (New) The method of claim 25, wherein creating the enhanced image includes at least one of displaying and printing the enhanced image.

27. (New) The method of claim 5, wherein diffusing the at least one scanned image dot includes distributing a darkness density of the at least one scanned image dot to at least one adjacent pixel.

28. (New) The system of claim 17, further comprising:  
an image reproduction unit adapted to produce an enhanced image based on the plurality of enhanced image sections.

29. (New) The system of claim 28, wherein the image production unit is adapted to at least one of display and print the enhanced image.

30. (New) The system of claim 17, wherein the image enhancement unit is adapted to distribute a darkness density of the at least one scanned image dot to at least one adjacent pixel.